REG10J0073-0100

Renesas Starter Kit
for H8SX/1622 User's Manual

RENESAS SINGLE-CHIP MICROCOMPUTER
H8SX FAMILY

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Chapter 1. Preface

Cautions

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Website: http://www.eu.renesas.com/

Glossary

CPU	Central Processing Unit	HEW	High-performance Embedded Workshop
LED	Light Emitting Diode	RSK	Renesas Starter Kit
PC	Program Counter	E10A	On-chip debugger module

Chapter 2. Purpose

This RSK is an evaluation tool for Renesas microcontrollers.

This manual describes the technical details of the RSK hardware. The Quick Start Guide and Tutorial Manual provide details of the software installation and debugging environment.

Features include:

- Renesas Microcontroller Programming.
- User Code Debugging.
- User Circuitry such as Switches, LEDs and potentiometer.
- User or Example Application.
- Sample peripheral device initialisation code.

The RSK board contains all the circuitry required for microcontroller operation.

Chapter 3. Power Supply

3.1. Requirements

This RSK operates from a 5V power supply. The Sigma Delta ADC part of RSK operates from a separate 5V power supply.

A diode provides reverse polarity protection only if a current limiting power supply is used.

All RSK boards are supplied with an E10A debugger. This product is able to power the RSK board with up to 300mA. When the RSK is connected to another system then that system should supply power to the RSK.

All RSK boards have an optional centre positive supply connector using a 2.0mm barrel power jack.

Warning

The RSK is neither under nor over voltage protected. Use a centre positive supply for this board.

3.2. Power – Up Behaviour

When the RSK is purchased the RSK board has the 'Release' or stand alone code from the example tutorial code pre-programmed into the Renesas microcontroller. On powering up the board the user LEDs will start to flash. After 200 flashes, or after pressing a switch the LEDs will flash at a rate controlled by the potentiometer.

Chapter 4. Board Layout

4.1. Component Layout

The following diagram shows top layer component layout of the board.

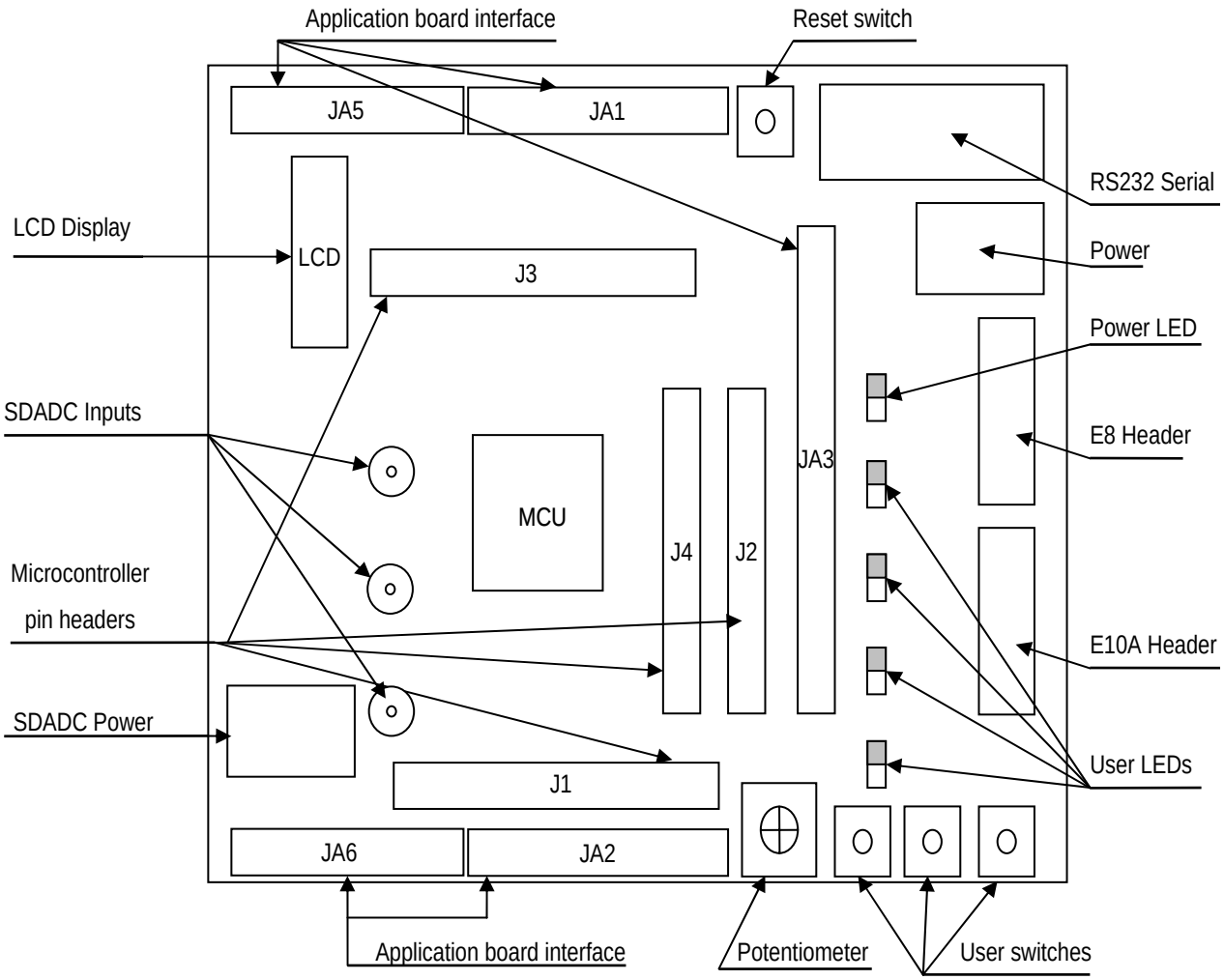

Figure 4-1: Board Layout

4.2. Board Dimensions

The following diagram gives the board dimensions and connector positions. All through hole connectors are on a common 0.1" grid for easy interfacing.

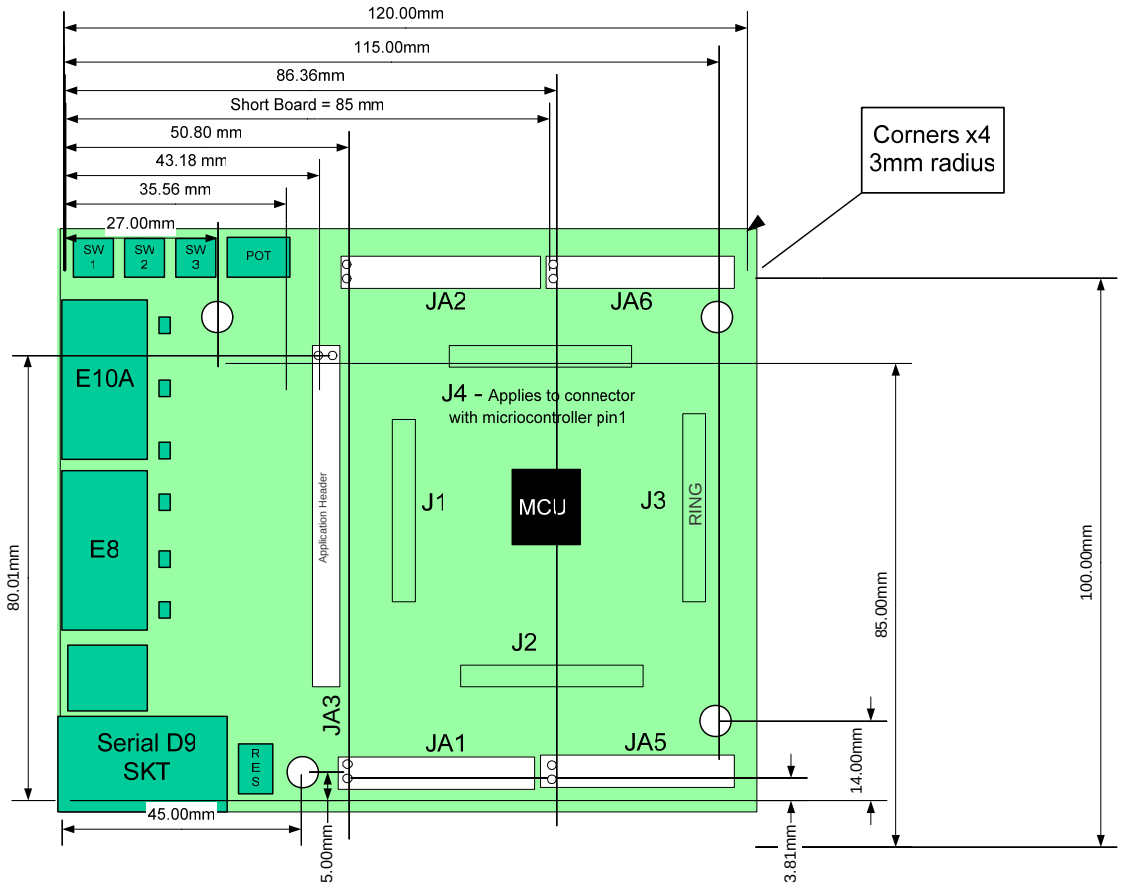

Figure 4-2 : Board Dimensions

Chapter 5. Block Diagram

Figure 5-1 shows the CPU board components and their connectivity.

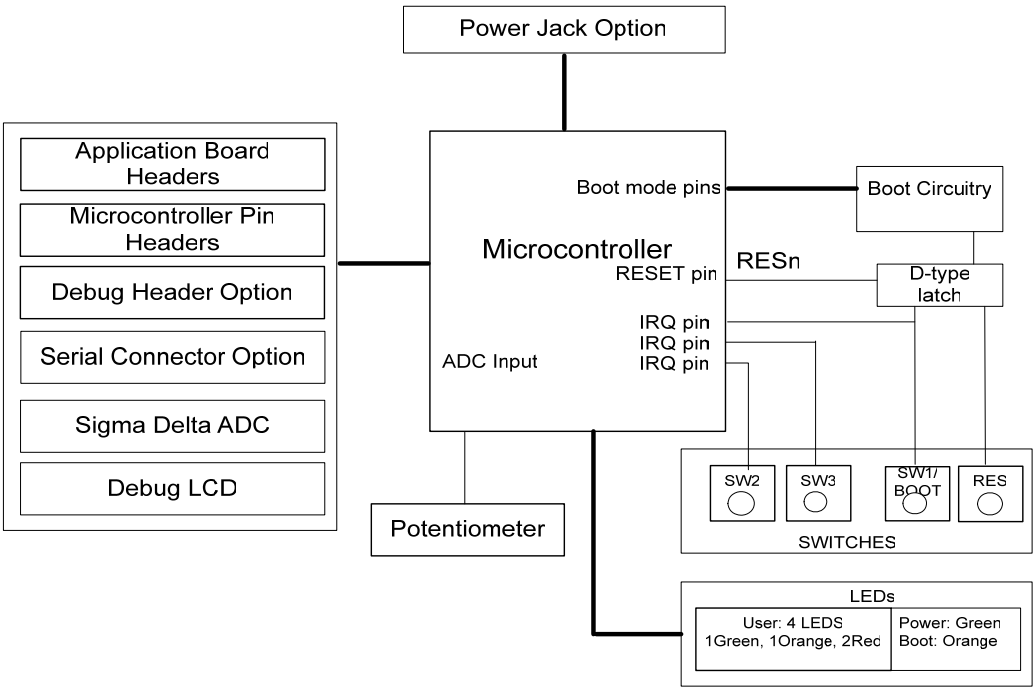

Figure 5-1: Block Diagram

Figure 5-2 shows the connections to the RSK.

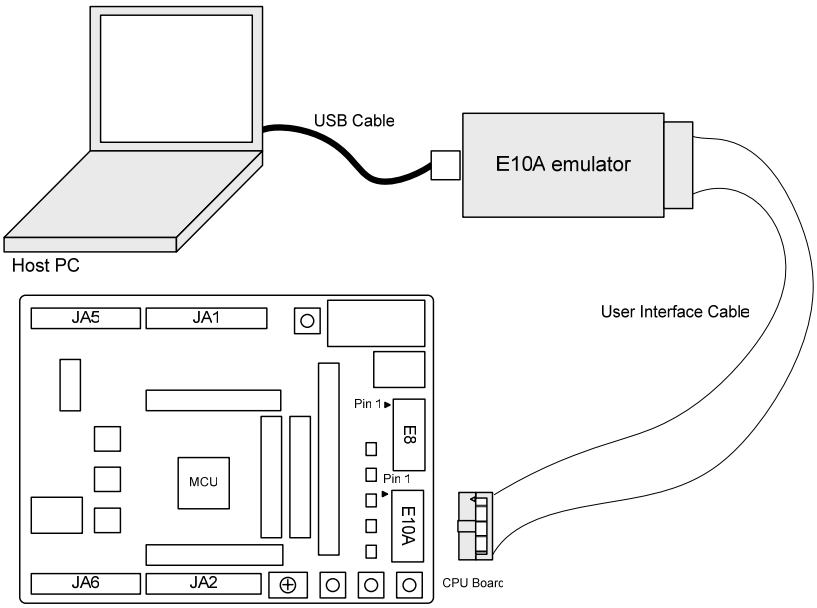

Figure 5-2 : RSK Connections

Chapter 6. User Circuitry

6.1. Switches

There are four switches located on the CPU board. The function of each switch and its connection are shown in Table 6-1.

Switch	Function	Microcontroller
RES	When pressed, the RSK microcontroller is reset.	RESn, Pin91
SW1/BOOT*	Connects to an IRQ input for user controls. The switch is also used in conjunction with the RES switch to place the device in BOOT mode when not using the E10A debugger.	IRQ4n, Pin 124 (Port 5, pin 4)
SW2*	Connects to an IRQ line for user controls.	IRQ5n, Pin 126 (Port 5, pin 5)
SW3*	Connects to the ADC trigger input. Option link allows connection to IRQ line. The option is a pair of 0R links. For more details on option links, please refer to Sec 6.6.	IRQ3n_ADTRGn, Pin 66 (Port 1, pin 3)

Table 6-1: Switch Functions

*Refer to schematic for detailed connectivity information.

6.2. LEDs

There are six LEDs on the RSK board. The green 'POWER' LED lights when the board is powered. The orange BOOT LED indicates the device is in BOOT mode when lit. The four user LEDs are connected to an IO port and will light when their corresponding port pin is set low.

Table 6-2, below, shows the LED pin references and their corresponding microcontroller port pin connections.

LED Reference (As shown on silkscreen)	Colour	Microcontroller Port Pin function	Microcontroller Pin Number
LED0	Green	Port A.0	17
LED1	Orange	Port A.2	19
LED2	Red	Port 1.7	60
LED3	Red	Port 1.6	62

Table 6-2: LED Port

6.3. Potentiometer

A single turn potentiometer is connected to AN0 (P5.0) of the microcontroller. This may be used to vary the input analogue voltage value to this pin between AVCC and Ground.

6.4. Serial port

Serial port SCI2 is connected to the standard RS232 header. Serial ports SCI4 can optionally be connected to the RS232 header by fitting option resistors. The connections to be fitted are listed in the Table 6-3.

Description	Function	Circuit Net Name	Device Pin	Fit for RS232	Remove for RS232
SCI2	Spare Serial Port	TxD2	69	R31	R37, R32
SCI2	Spare Serial Port	RxD2	68	R30	R36, R33
SCI4	Programming serial port	TxD4	107	R37	R6, R31, R32
SCI4	Programming serial port	RxD4	108	R36	R5, R30, R33

Table 6-3: Serial Port settings

The SCI2 port is also available on J2 and JA2. The SCI3 port is available on JA6.

6.5. Debug LCD Module

A debug LCD module is supplied to be connected to the connector LCD. This should be fitted so that the debug LCD module lies over J3. Care should be taken to ensure the pins are inserted correctly into LCD. The debug LCD module uses a 4 bit interface to reduce the pin allocation. No contrast control is provided; this is set by a resistor on the supplied display module. The module supplied with the RSK only supports 5V operation.

Table 6-4 shows the pin allocation and signal names used on this connector.

LCD					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	Ground	-	2	5V Only	-
3	No Connection	-	4	DLCDRS (P34)	94
5	R/W (Wired to Write only)	-	6	DLCDE+ 100k pull down to ground (P36)	92
7	No Connection	-	8	No connection	-
9	No Connection	-	10	No connection	-
11	DLCDD4 (P20)	52	12	DLCDD5 (P21)	53
13	DLCDD6 (P22)	54	14	DLCDD7 (P23)	55

Table 6-4 Debug LCD Module Connections

6.6. Option Links

Table 6-5 below describes the function of the option links contained on this RSK board and associated with Serial Port Configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R5	Serial Port Configuration	**Connects programming port (Rx) to E8 connector.**	Disconnects programming port (Rx) from E8 connector.	R6
R6	Serial Port Configuration	**Connects programming port (Tx) to E8 connector.**	Disconnects programming port (Tx) from E8 connector.	R5
R15	Serial Port Configuration	Connects serial port SCI3 (Tx) to D-type connector (SERIAL).	**Disconnects serial port SCI3 (Rx) from D-type connector (SERIAL).**	R28
R19	Serial Port configuration	Disables RS232 Serial Transceiver	**Enables RS232 Serial Transceiver**	-
R28	Serial Port Configuration	Connects serial port SCI3 (Tx) to D-type connector (SERIAL).	**Disconnects serial port SCI3 (Tx) from D-type connector (SERIAL).**	R15
R30	Serial Port Configuration	**Routes serial port RXD2 (Rx) to microcontroller pins.**	Disconnects serial port RXD2 (Rx) from microcontroller pins.	R31, R32, R33
R31	Serial Port Configuration	**Routes serial port TXD2 (Tx) to microcontroller pins.**	Disconnects serial port TXD2 (Tx) from microcontroller pins.	R30, R32, R33
R32	Serial Port Configuration	Routes serial port RS232TX (JA6) to microcontroller pins.	**Disconnects serial port RS232TX (JA6) from microcontroller pins.**	R30, R31, R33
R33	Serial Port Configuration	Routes serial port RS232RX (JA6) to microcontroller pins.	**Disconnects serial port RS232TX (JA6) from microcontroller pins.**	R30, R31, R32
R36	Serial Port Configuration	Connects programming port (Rx) to external connectors (not E8).	**Disconnects programming port (Rx) from external connectors (not E8).**	R5, R6, R37
R37	Serial Port Configuration	Connects programming port (Tx) to external connectors (not E8).	**Disconnects programming port (Tx) from external connectors (not E8).**	R5, R6, R36

Table 6-5: Serial port configuration links.

Table 6-6 below describes the function of the option links associated with application board interface. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R53	Application board interface	Use AN0 of application board interface.	**Connects analog channel AN0 of the MCU to AD_POT.**	R95
R54	Application board interface	Use TEND0n of application board interface.	**Use RXD2 of application board interface.**	R123
R59	Application board interface	**Connects port pin P16 of the MCU to LED3.**	Use SCK3 of application board interface.	R76
R66	Application board interface	**Use SCK2 of application board interface.**	Use DACK0n of application board interface.	R79
R67	Application board interface	**Use TMR0 of application board interface.**	Use IO_6 of application board interface.	R78
R69	Application board interface	Use IO_0 of application board interface.	**Use DLCDD4 of application board interface.**	R114
R70	Application board interface	**Use TRIGb of application board interface.**	Use IO_7 of application board interface.	R82
R74	Application board interface	Use IO_5 of application board interface.	**Use TRIGa of application board interface.**	R88
R75	Application board interface	Use IO_2 of application board interface.	**Use DLCDD6 of application board interface.**	R81
R76	Application board interface	Use SCK3 of application board interface.	**Connects port pin P16 of the MCU to LED3.**	R59
R78	Application board interface	Use IO_6 of application board interface.	**Use TMR0 of application board interface.**	R67
R79	Application board interface	Use DACK0n of application board interface.	**Use SCK2 of application board interface.**	R66
R81	Application board interface	**Use DLCDD6 of application board interface.**	Use IO_2 of application board interface.	R75
R82	Application board interface	Use IO_7 of application board interface.	**Use TRIGb of application board interface.**	R70
R84	Application board interface	Use IO_3 of application board interface.	**Use DLCDD7 of application board interface.**	R90
R85	Application board interface	**Use TMR1 of application board interface.**	Use IO_4 of application board interface.	R86
R86	Application board interface	Use IO_4 of application board interface.	**Use TMR1 of application board interface.**	R85

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R88	Application board interface	Use TRIGa of application board interface.	Use IO_5 of application board interface.	R74
R90	Application board interface	Use DLCDD7 of application board interface.	Use IO_3 of application board interface.	R84
R95	Application board interface	Connects analog channel AN0 of the MCU to AD_POT.	Use AN0 of application board interface.	R53
R114	Application board interface	Use DLCDD4 of application board interface.	Use IO_0 of application board interface.	R69
R115	Application board interface	Use IO_1 of application board interface.	Use DLCDD5 of application board interface.	R116
R116	Application board interface	Use DLCDD5 of application board interface.	Use IO_1 of application board interface.	R115
R123	Application board interface	Use RXD2 of application board interface.	Use TEND0n of application board interface.	R54
R135	Application board interface	Use TDO of application board interface.	Use WDTOVFn of application board interface.	R157
R136	Application board interface	Use TXD2 of application board interface.	Use DREQ0n of application board interface.	R150
R137	Application board interface	Use DLCDRS of application board interface.	Use Vp of application board interface.	R151
R138	Application board interface	Use DLCDE of application board interface.	Use Wp of application board interface.	R152
R139	Application board interface	Use TCLKC of application board interface.	Use Vn of application board interface.	R153
R140	Application board interface	Use TCLKD of application board interface.	Use Wn of application board interface.	R154
R141	Application board interface	Use CS2n of application board interface.	Use TIOCC0 of application board interface.	R155
R142	Application board interface	Use Un of application board interface.	Use TIOCB0 of application board interface.	R156
R143	Application board interface	Use CS0n of application board interface.	Use Up of application board interface if R158 is fitted or TIOCA0 if R159 is fitted.	R158, R159
R147	Application board interface	Use LED0 of application board interface.	Use TRISTn of application board interface.	R163
R148	Application board interface	Use LED2 of application board interface.	Use UD of application board interface.	R164

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R150	Application board interface	Use DREQ0n of application board interface.	Use TXD2 of application board interface.	R136
R151	Application board interface	Use Vp of application board interface.	Use DLCDRS of application board interface.	R137
R152	Application board interface	Use Wp of application board interface.	Use DLCDE of application board interface.	R138
R153	Application board interface	Use Vn of application board interface.	Use TCLKC of application board interface.	R139
R154	Application board interface	Use Wn of application board interface.	Use TCLKD of application board interface.	R140
R155	Application board interface	Use TIOCC0 of application board interface.	Use CS2n of application board interface.	R141
R156	Application board interface	Use TIOCB0 of application board interface.	Use Un of application board interface	R142
R157	Application board interface	Use WDTOVFn of application board interface.	Use TDO of application board interface.	R135
R158	Application board interface	Use Up of application board interface.	Use CS0n of application board interface if R143 is fitted or TIOCA0 if R159 is fitted.	R143, R159
R159	Application board interface	Use TIOCA0 of application board interface.	Use CS0n of application board interface if R143 is fitted or Up if R158 is fitted.	R143, R158
R163	Application board interface	Use TRISTn of application board interface.	Use LED0 of application board interface.	R147
R164	Application board interface	Use UD of application board interface.	Use LED2 of application board interface.	R148
R185	Application board interface	Connects SW3 to JA2 header pin 23.	Disconnects SW3 from JA2 header pin 23.	R190
R190	Application board interface	Connects SW3 to JA1 header pin 8.	Disconnects SW3 from JA1 header pin 8.	R185
R204	Application board interface	Connects PIN64 to SCL1.	Disconnects PIN64 from SCL1.	R205, R206, R207
R205	Application board interface	Connects PIN65 to SDA1.	Disconnects PIN65 from SDA1.	R204, R206, R207
R206	Application board interface	Connects PIN65 to TXD3	Disconnects PIN65 from TXD3.	R204, R205, R207

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R207	Application board interface	Connects PIN64 to RXD3	**Disconnects PIN64 from RXD3.**	R204, R205, R206
R238	Application board interface	Connects 5V power supply source feed at PWR_D to analog section	**Separate power supply needs to be supplied to analog section**	-

Table 6-6: Application board interface links.

Table 6-7 below describes the function of the option links associated with E8 and E10A debuggers. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R4	E8	**Enables E8**		-
R118	E8	**Programming Flash not using SERIAL port.**	Programming Flash using SERIAL port.	-
R131	E8	If fitted or J7 is set board uses User Boot Mode.	**Removed or J7 isn't set board doesn't use User Boot Mode.**	-
R132	E10A	Enables E10A, also can be enabled by fitting J5.	**E10A is disabled, can be enabled if J5 is set.**	-

Table 6-7: E8 and E10A debugger links.

Table 6-8 below describes the function of the option links associated with power source. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R173	Power source (ADC SD)	**Enables power to ADC SD from external source.**	Disable external power connector for ADC SD.	-
R178	Power source	**Enables power from E8.**	Disable E8 power source	-
R179	Power source	**Board can be powered from external source CON_3V3 (JA1 header pin 3)**	Board can't be powered from external source CON_3V3 (JA1 header pin 3)	R181
R180	Power source	**Enables power from external source.**	Disable external power connector.	-
R181	Power source	**Fitted if board is not powered from external source CON_3V3 (JA1 header pin 3)**	Removed if board is powered from external source CON_3V3 (JA1 header pin 3)	R179, R182
R182	Power source	**Board can be powered from external source CON_5V (JA1 header pin 1)**	Board can't be powered from external source CON_5V (JA1 header pin 1)	R179, R183

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R183	Power source	**Enables power to board peripheral devices.**	Disconnects power to board peripheral devices.	R179, R182
R184, R240	Ground	**Connects high speed ADC ground to digital ground**	Disconnects high speed ADC ground from digital ground.	-
R186	MCU power supply	**Supply to MCU.**	CPU current can be measured across R186	-
R237, R239	Ground	**Connects SDADC ground to digital ground.**	Disconnects SDADC ground from digital ground	-

Table 6-8: Power configuration links.

Table 6-9 below describes the function of the option links associated with SD ADC configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R187	ADC SD source	**Enables ANDS4P connector.**	Disconnects ANDS4P connector.	R188, R189
R188	ADC SD source	**Enables ANDS4N connector.**	Disconnects ANDS4N connector.	R187, R189
R189	ADC SD source	**Enables ANDS0 connector.**	Disconnects ANDS0 connector.	R187, R188

Table 6-9: SD ADC configuration links.

Table 6-10 below describes the function of the option links associated with clocks configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R219	Clock Oscillator	Parallel resistor for crystal	**Not fitted**	-
R215	Clock Oscillator	**On-board clock source is used**	External clock source is used	-
R218	Clock Oscillator	**On-board clock source is used**	External clock source is used	-
R220	Clock Oscillator	External clock source	**On-board clock source**	-
R221	Clock Oscillator	External clock source	**On-board clock source**	-

Table 6-10: Clock configuration links.

Table 6-11 below describes the function of the option links associated with analog power supply. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R217	Analog Voltage Source	**Analog voltage source from on board Vcc.**	Analog Voltage Source from external connector.	R222
R222	Analog Voltage Source	Analog Voltage Source from external connector.	**Analog voltage source from on board Vcc.**	R217
R224	Analog Voltage Source	Analog Voltage Source from external connector.	**Analog voltage source from on board Vcc.**	-

Table 6-11: Analog power supply links.

Table 6-12 below describes the function of the option links associated with reference voltage source. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R223	Voltage Reference Source	Voltage Reference taken from external connector (JA1 pin 7).	**Voltage Reference set to board Vcc signal.**	R216
R216	Voltage Reference Source	**Voltage Reference set to board Vcc signal.**	Voltage Reference taken from external connector (JA1 pin 7).	R223

Table 6-12: Voltage reference links.

Table 6-13 below describes the function of the option links associated with MCU modes. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R232	MCU Mode	MCU Extended mode enabled, also can be enabled by fitting jumper in J12	**MCU Extended mode disabled**	R233
R233	MCU Mode	MCU User Boot Mode enabled, also can be enabled by fitting jumper in J13	**MCU User Boot mode disabled**	R232

Table 6-13: MCU mode links.

6.7. Oscillator Sources

A crystal oscillator is fitted on the RSK and used to supply the main clock input to the Renesas microcontroller. Table 6-6 details the oscillators that are fitted and alternative footprints provided on this RSK:

Component		
Crystal (X1)	Fitted	12 MHz (HC49/4H package)

Table 6-6: Oscillators / Resonators

6.8. Reset Circuit

The CPU Board includes a simple latch circuit that links the mode selection and reset circuit. This provides an easy method for swapping the device between Boot Mode and User mode. This circuit is not required on customer's boards as it is intended for providing easy evaluation of the operating modes of the device on the RSK. Please refer to the hardware manual for more information on the requirements of the reset circuit.

The Reset circuit operates by latching the state of the boot switch on pressing the reset button. This control is subsequently used to modify the mode pin states as required.

The mode pins should change state only while the reset signal is active to avoid possible device damage.

The reset is held in the active state for a fixed period by a pair of resistors and a capacitor. Please check the reset requirements carefully to ensure the reset circuit on the user's board meets all the reset timing requirements.

6.9. Sigma Delta ADC

H8SX/1622 CPU includes six - channel Sigma Delta 16-bit Analog to Digital Converter. The RSK accepts up to two analog inputs. One is for the single - ended and the second for differential signal. ANDS0_IN connector can be used to connect to single - ended signal. ANDS4P_IN and ANDS4N_IN connectors can be used for differential signal.

By default, the Sigma Delta ADC is powered from PWR_D connector, but as an option it may have a separate power supply (please refer to Option Links 6.6 Sigma Delta ADC section) connected to ANALOG_POWER connector (5 volts). Please refer to the silkscreen labels on the RSK board to avoid connecting a power supply incorrectly.

Warning! Please note that overloading of inputs can cause permanent damage to the CPU and RSK. The maximum ratings for inputs can be found in section 25 'Electrical Characteristics' of H8SX/1622 Group Hardware Manual.

For more details on H8SX/1622 on-chip Sigma Delta ADC module, please refer to H8SX/1622 Group Hardware Manual.

Chapter 7. Modes

This RSK supports Boot mode, User mode, MCU Extension Mode (ROM Active) and Single Chip mode.

Details of programming the FLASH memory is described in the H8SX/1622 Group Hardware Manual.

7.1. Boot mode

The boot mode settings for this RSK are shown in Table 7-1: Boot Mode pin settings below:

EMLE	MD2	MD1	MD0	LSI State after Reset End
0	0	1	0	Boot Mode

Table 7-1: Boot Mode pin settings

The software supplied with this RSK supports debugging with E10A which does not need Boot mode. To enter the Boot manually, do not connect the E10A. Press and hold the SW1/BOOT. The BOOT LED will be illuminated to indicate that the microcontroller is in boot mode.

7.2. User mode

Refer to H8SX/1622 Group Hardware Manual for details of User mode. The user mode settings for this RSK are shown in Table 7-2: user Mode pin settings below:

EMLE	MD2	MD1	MD0	LSI State after Reset End
0	0	0	1	User Mode

Table 7-2: User Mode pin settings

7.3. MCU Extension mode (ROM Active)

Refer to H8SX/1622 Group Hardware Manual for details of Extended mode. The MCU Extension mode settings for this RSK are shown in Table 7-3: MCU Extension Mode pin settings below:

EMLE	MD2	MD1	MD0	LSI State after Reset End
0	1	1	0	MCU Extension Mode (ROM Active)

Table 7-3: MCU Extension Mode (ROM Active) pin settings

7.4. Single chip mode

This is the default operating mode of this RSK. Refer to H8SX/1622 Group Hardware Manual for details of Single chip mode. The Single chip mode settings for this RSK are shown in Table 7-4: Single chip mode pin settings below:

EMLE	MD2	MD1	MD0	LSI State after Reset End
0	1	1	1	Single chip Mode

Table 7-4: Single chip Mode pin settings

Chapter 8. Programming Methods

The board is intended for use with HEW and the supplied E10A debugger. Refer to H8SX/1622 Group Hardware Manual for details of programming the microcontroller without using these tools. Please note that to use E10A debugger, jumper J5 must be fitted.

Chapter 9. Headers

9.1. Microcontroller Headers

Table 9-1 to Error! Reference source not found. show the microcontroller pin headers and their corresponding microcontroller connections. The header pins connect directly to the microcontroller pin unless otherwise stated.

J1					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	AGND	1	2	AVCC2	2
3	PIN3	3	4	PIN4	4
5	PIN5	5	6	PIN6	6
7	NC	7	8	NC	8
9	NC	9	10	PIN10	10
11	PIN11	11	12	PIN12	12
13	PIN13	13	14	MD2	14
15	MD1	15	16	GROUND	16
17	LED0_TRISTn	17	18	WRn	18
19	LED1	19	20	LLWRn	20
21	LHWRn	21	22	RDn	22
23	ASn	23	24	GROUND	24
25	BCLK	25	26	UC_VCC	26
27	A20	27	28	GROUND	28
29	A19	29	30	A18	30
31	A17	31	32	A16	32
33	A15	33	34	A14	34
35	A13	35	36	A12	36

Table 9-1: J1

J2					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	A11	37	2	A10	38
3	GROUND	39	4	A9	40
5	A8	41	6	A7	42
7	A6	43	8	A5	44
9	GROUND	45	10	A4	46
11	UC_VCC	47	12	A3	48
13	A2	49	14	A1	50
15	A0	51	16	DLCDD4_IO0	52
17	DLCDD5_IO1	53	18	DLCDD6_IO2	54
19	DLCDD7_IO3	55	20	TMR1_IO4	56
21	TRIGa_IO5	57	22	TMR0_IO6	58
23	TRIGb_IO7	59	24	LED2_UD	60
25	GROUND	61	26	LED3_SCK3	62
27	UC_VCC	63	28	PIN64	64
29	PIN65	65	30	IRQ3n_ADTRGn	66
31	SCK2_DACK0n	67	32	RXD2_TEND0n	68
33	TXD2_ DREQ0n	69	34	EMLE	70
35	D0	71	36	D1	72

Table 9-2: J2

J3					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	D2	73	2	D3	74
3	GROUND	75	4	D4	76
5	D5	77	6	D6	78
7	D7	79	8	D8	80
9	D9	81	10	D10	82
11	UC_VCC	83	12	D11	84
13	D12	85	14	D13	86
15	D14	87	16	GROUND	88
17	D15	89	18	DLCDRS_Vp	90
19	RESn	91	20	DLCDE_Wp	92
21	TCLKC_Vn	93	22	TCLKD_Wn	94
23	CS3n	95	24	GROUND	96
25	CON_XTAL	97	26	CON_EXTAL	98
27	UC_VCC	99	28	CS2n_TIOCC0	100
29	Un_TIOCB0	101	30	STBYn	102
31	NC		32	TDO_WDTOVFn	104
33	GROUND	105	34	CS0n_Up_TIOCA0	106
35	PTTX	107	36	PTRX	108

Table 9-3: J3

J4					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	TRSTn	109	2	NC	
3	TMS	111	4	NC	
5	TDI	113	6	TCK	114
7	UC_VCC	115	8	NMI	116
9	MD0	117	10	ADPOT_AN0	118
11	AN1	119	12	AN2	120
13	CON_AVCC	121	14	AN3	122
15	AVSS	123	16	IRQ4n	124
17	CON_VREF	125	18	IRQ5n	126
19	DA0	127	20	DA1	128
21	AGND	129	22	AVCC2	130
23	NC		24	NC	
25	NC		26	NC	
27	NC		28	NC	
29	NC		30	NC	
31	NC		32	AVCC2	140
33	AGND	141	34	NC	
35	AGND	143	36	AVCC1	144

Table 9-4: J4

9.2. Application Headers

Table 9-5 to Table 9-9 below show the standard application header connections.

JA1							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Generic Header Name	CPU board Signal Name	Device Pin
1	5V	CON_5V	-	2	0V	GROUND	8
3	3V3	CON_3V3	-	4	0V	GROUND	-
5	AVCC	CON_AVCC	121	6	AVss	AVSS	123
7	AVref	CON_VREF	125	8	ADTRG	ADTRGn	66
9	AD0	AN0	118	10	AD1	AN1	119
11	AD2	AN2	120	12	AD3	AN3	122
13	DAC0	DA0	127	14	DAC1	DA1	128
15	IO_0	IO_0	52	16	IO_1	IO_1	53
17	IO_2	IO_2	54	18	IO_3	IO_3	55
19	IO_4	IO_4	56	20	IO_5	IO_5	57
21	IO_6	IO_6	58	22	IO_7	IO_7	59
23	IRQ3	NC	-	24	IIC_EX	NC	-
25	IIC_SDA	SDA1	65	26	IIC_SCL	SCL1	64

Table 9-5: JA1 Standard Generic Header

JA2							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Header Name	CPU board Signal Name	Device Pin
1	RESn	RESn	91	2	EXTAL	CON_EXTAL	98
3	NMI	NMI	116	4	VSS1	GROUND	
5	WDT_OVF	WDTOVFn	104	6	SCIaTX	TXD2	69
7	IRQ0	IRQ4n	124	8	SCIaRX	RXD2	68
9	IRQ1	IRQ5n	126	10	SCIaCK	SCK2	67
11	UD	UD	60	12	CTS/RTS	NC	-
13	Up	Up	106	14	Un	Un	101
15	Vp	Vp	94	16	Vn	Vn	93
17	Wp	Wp	92	18	Wn	Wn	90
19	TMR0	TMR0	58	20	TMR1	TMR1	56
21	TRIGa	TRIGa	57	22	TRIGb	TRIGb	59
23	IRQ2	IRQ3n_ADTRGn	66	24	TRISTn	TRISTn	17
25	-	-		26	-	-	-

Table 9-6: JA2 Standard Generic Header

JA5							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Header Name	CPU board Signal Name	Device Pin
1	AD4	-	-	2	AD5	-	-
3	AD6	-	-	4	AD7	-	-
5	CAN1TX	-	-	6	CAN1RX	-	-
7	CAN2TX	-	-	8	CAN2RX	-	-
9	AD8	-	-	10	AD9	-	-
11	AD10	-	-	12	AD11	-	-
13	TIOC0A	TIOCA0	106	14	TIOC0B	TIOCB0	101
15	TIOC0C	TIOCC0	100	16	M2_TRISTn	-	-
17	TCLKC	TCLKC	93	18	TCLKD	TCLKD	90
19	M2_Up	-	-	20	M2_Un	-	-
21	M2_Vp	-	57	22	M2_Vn	-	-
23	M2_Wp	-	66	24	M2_Wn	-	-

Table 9-7: JA5 Standard Generic Header

JA6							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Header Name	CPU board Signal Name	Device Pin
1	DREQ	DREQ0n	69	2	DACK	DACK0n	67
3	TEND	TEND0n	68	4	STBYn	STBYn	102
5	RS232TX	RS232TX	-	6	RS232RX	RS232RX	-
7	SCIbRX	RxD3	65	8	SCIbTX	TxD3	64
9	SCIcTX	-	-	10	SCIbCK	SCK3	62
11	SCIcCK	-	-	12	SCIcRX	-	-
13	-	-	-	14	-	-	-
15	-	-	-	16	-	-	-
17	-	-	-	18	-	-	-
19	-	-	-	20	-	-	-
21	-	-	-	22	-	-	-
23	-	-	-	24	-	-	-

Table 9-8: JA6 Standard Generic Header

JA3							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Header Name	CPU board Signal Name	Device Pin
1	A0	A0	51	2	A1	A1	50
3	A2	A2	49	4	A3	A3	48
5	A4	A4	46	6	A5	A5	44
7	A6	A6	43	8	A7	A7	42
9	A8	A8	41	10	A9	A9	40
11	A10	A10	38	12	A11	A11	37
13	A12	A12	36	14	A13	A13	35
15	A14	A14	34	16	A15	A15	33
17	D0	D0	71	18	D1	D1	72
19	D2	D2	73	20	D3	D3	74
21	D4	D4	76	22	D5	D5	77
23	D6	D6	78	24	D7	D7	79
25	RDn	RDn	22	26	WRn	WRn	18
27	CSan	CS0n	106	28	CSbn	CS2n	100
29	D8	D8	80	30	D9	D9	81
31	D10	D10	82	32	D11	D11	84
33	D12	D12	85	34	D13	D13	86
35	D14	D14	87	36	D15	D15	89
37	A16	A16	32	38	A17	A17	31
39	A18	A18	30	40	A19	A19	29
41	A20	A20	27	42	A21	-	-
43	A22	-	-	44	SDCLK	BCLK	25
45	CScn	CS3n	95	46	ALE	AS	23
47	HWRn	LHWRn	21	48	LWRn	LLWRn	20
49	CASn	-	-	50	RASn	-	-

Table 9-9: JA3 Standard Generic Header

Chapter 10. Code Development

10.1. Overview

Note: For all code debugging using Renesas software tools, the RSK board must be connected to a PC USB port via an E10A. An E10A pod is supplied with the RSK product.

10.2. Compiler Restrictions

The compiler supplied with this RSK is fully functional for a period of 60 days from first use. After the first 60 days of use have expired, the compiler will default to a maximum of 64k code and data. To use the compiler with programs greater than this size you need to purchase the full tools from your distributor.

Warning: The protection software for the compiler will detect changes to the system clock. Changes to the system clock back in time may cause the trial period to expire prematurely.

10.3. Mode Support

HEW connects to the Microcontroller and programs it via the E10A. Mode support is handled transparently to the user.

10.4. Breakpoint Support

HEW supports breakpoints on the user code, both in RAM and ROM.

Double clicking in the breakpoint column in the code sets the breakpoint. Breakpoints will remain unless they are double clicked to remove them.

10.5. Memory Map

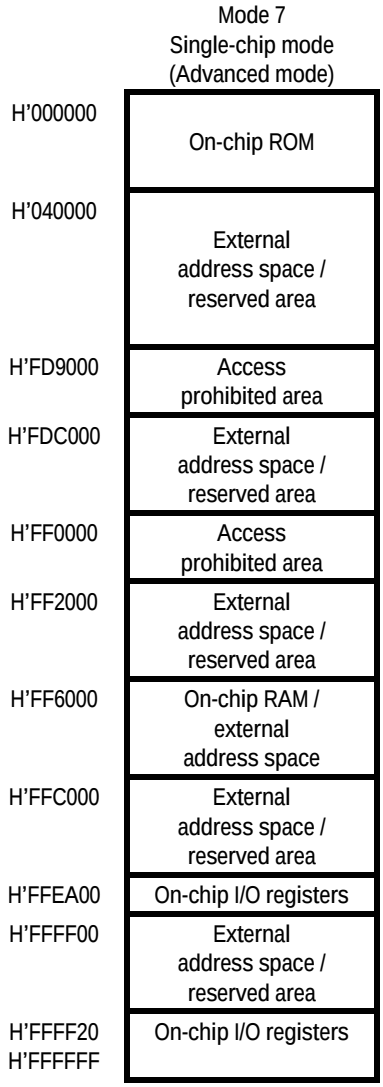

Figure 10-1: Memory Map

Chapter 11. Component Placement

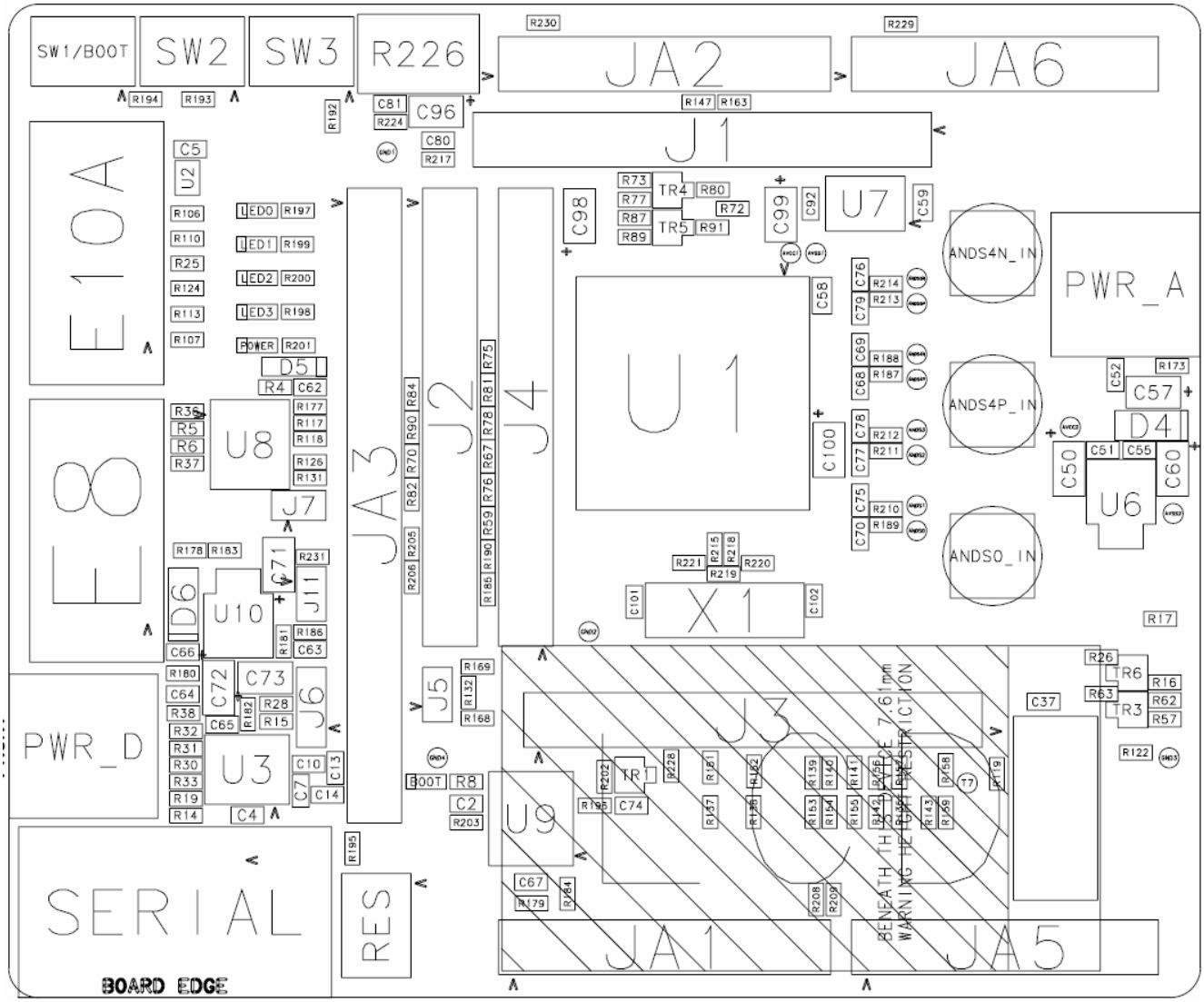

Figure 11-1: Component Placement – Front view

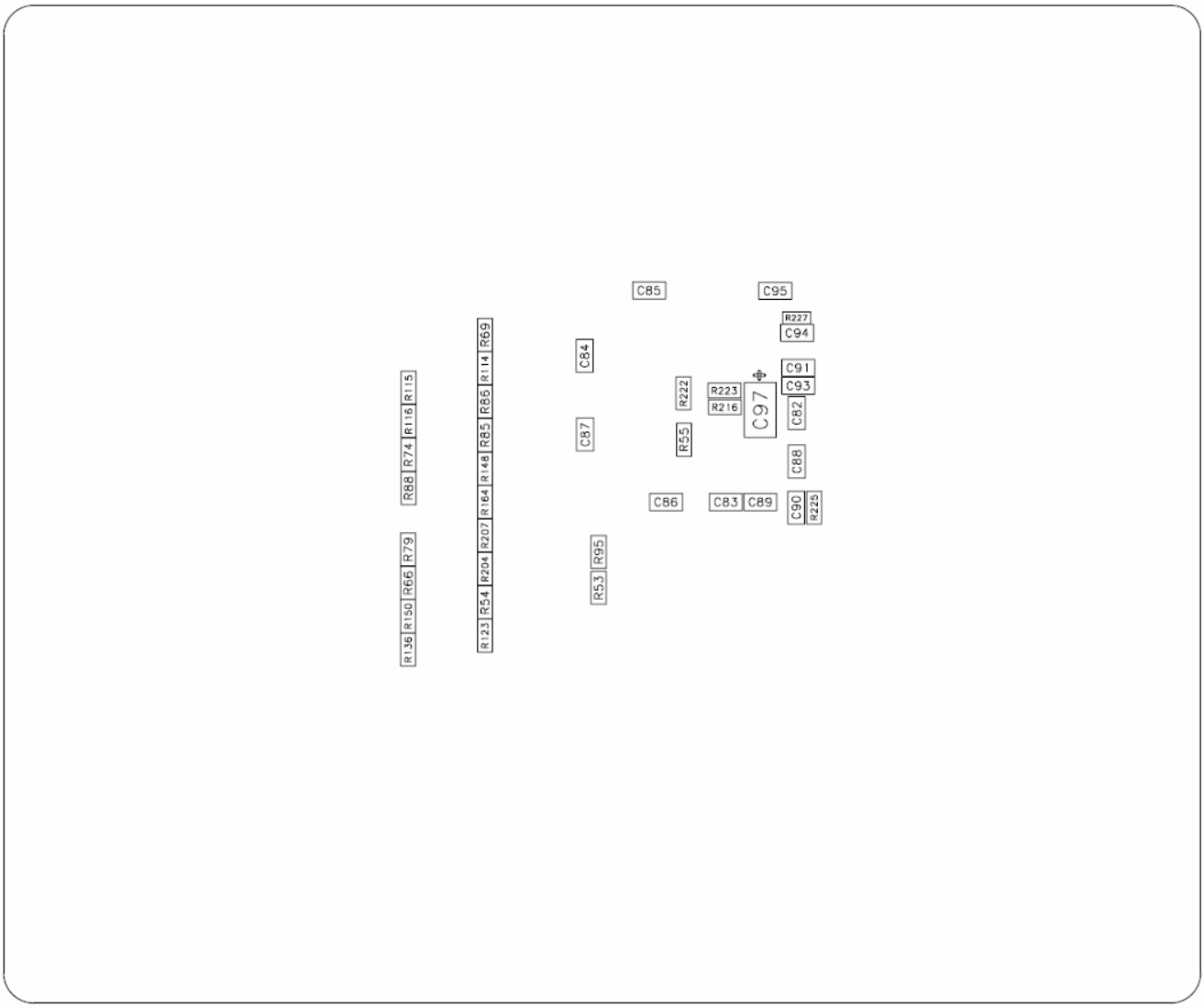

Figure 11-2: Component Placement – Back view

Chapter 12. Additional Information

For details on how to use High-performance Embedded Workshop (HEW, refer to the HEW manual available on the CD or from the web site.

For information about the H8SX/1622 series microcontrollers refer to the H8SX/1622 Group hardware manual.

For information about the H8SX/1622 assembly language, refer to the H8SX Series Software Manual.

Online technical support and information is available at: http://www.renesas.com/renesas_starter_kits

Technical Contact Details

America: techsupport.rta@renesas.com

Europe: tools.support.eu@renesas.com

Japan: csc@renesas.com

General information on Renesas Microcontrollers can be found on the Renesas website at: http://www.renesas.com/

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Renesas Starter Kit for H8SX/1622
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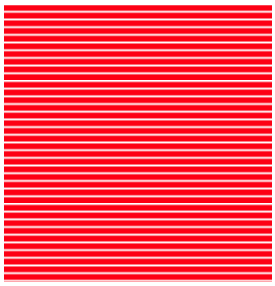

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